

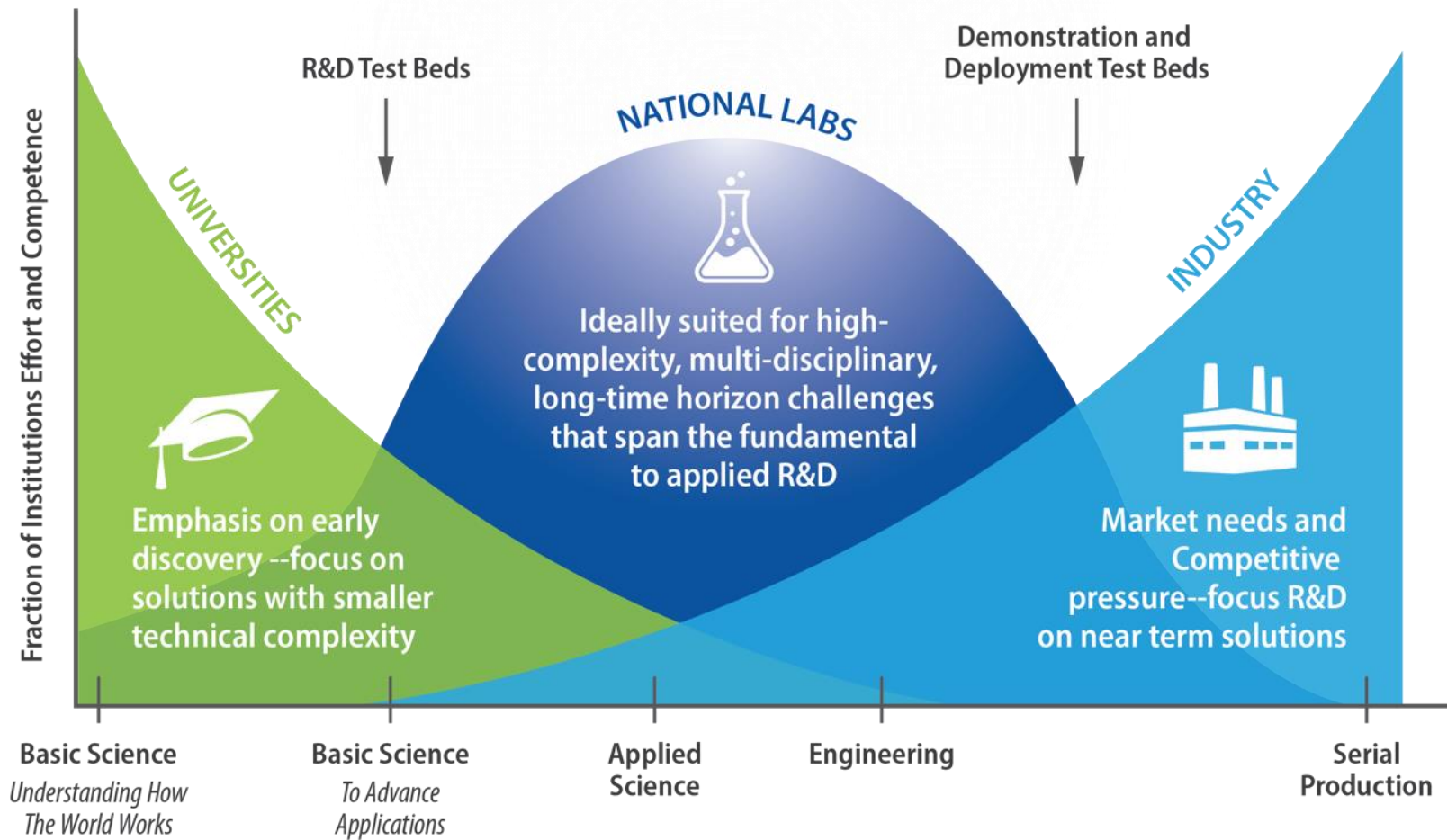
Jhansi Kandasamy
Executive Director
INL Net-Zero Program

Idaho National Laboratory: The Role of Nuclear in Reaching Net-Zero Emissions

DOE National Laboratories

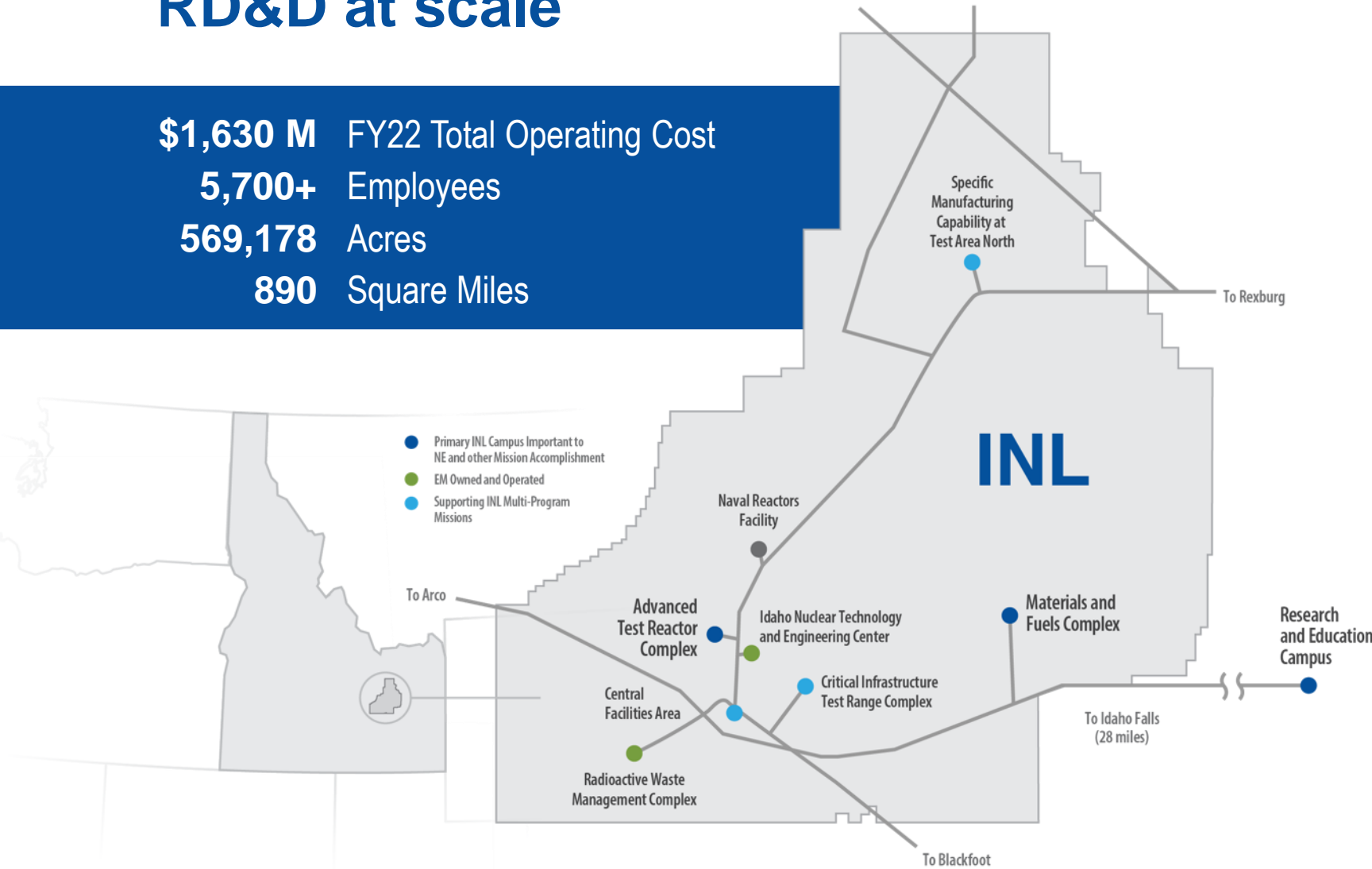


DOE labs support the entire technology lifecycle



Unique INL site, infrastructure, and facilities enable energy and security RD&D at scale

\$1,630 M FY22 Total Operating Cost
5,700+ Employees
569,178 Acres
890 Square Miles



4 Operating reactors

22 Hazard Category II & III non-reactor facilities/ activities

49 Radiological facilities/activities

17.5 Miles railroad for shipping nuclear fuel

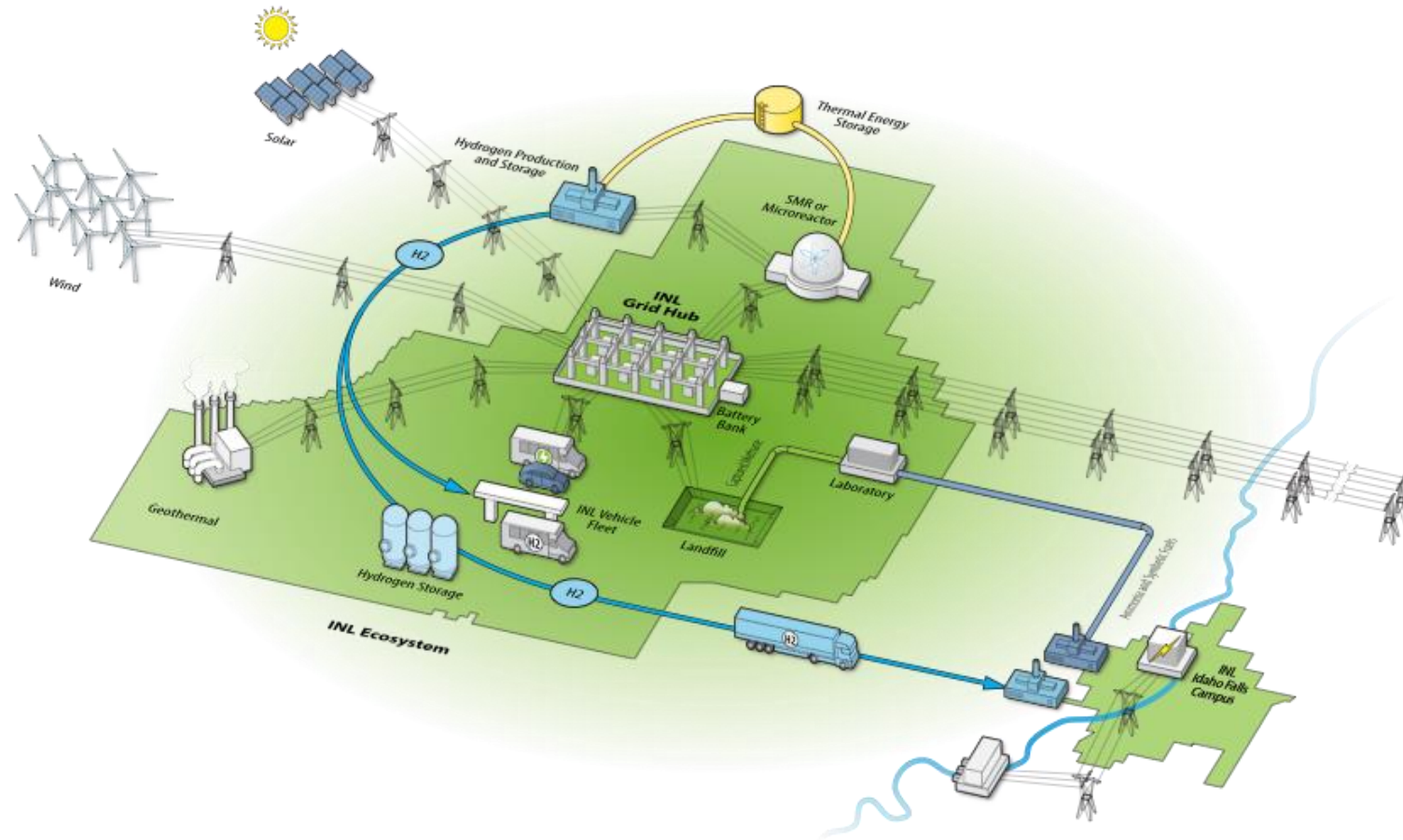
44 Miles primary roads (125 miles total)

9 Substations with interfaces to two power providers

128 Miles high-voltage transmission & distribution lines

3 Fire Stations

Net-Zero City



INL's Roadmap to Net-Zero through Nuclear

Time to Market and Operability Case Study for On-Site Microreactor Deployment

Infrastructure & Siting

Developing infrastructure and siting resources necessary for onsite deployment

Licensing & Regulation

Determine efficient, timely and economical process

Fuel Cycle

Entire cycle from fuel identification to waste management

Financial & Contracting

Identify financial structure and funding methodology

Public Engagement: Communication, Outreach, and Education

NRIC/NRC Collaboration

- Congress recognized the importance of agency coordination in the Nuclear Energy Innovation Capabilities Act
- DOE/NRC MOU to “coordinate DOE and NRC technical readiness and sharing of technical expertise and knowledge on advanced nuclear reactor technologies and nuclear energy innovation, including reactor concepts demonstrations, through the [NRIC].”
 - NRIC Rotations



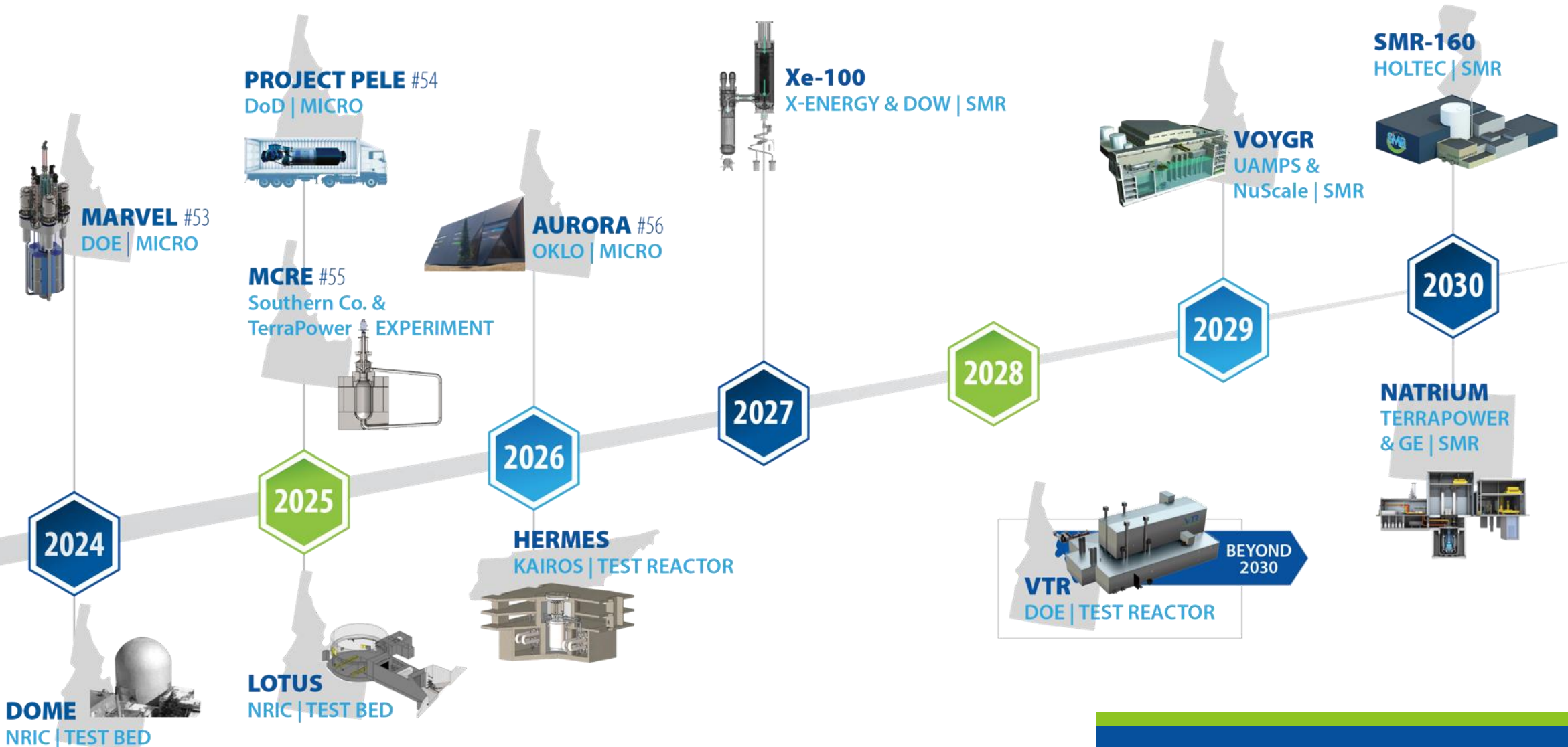
*Fred Sock
Office of
Nuclear
Regulatory
Research*



*Allen Fetter
Office of Nuclear
Reactor
Regulation*

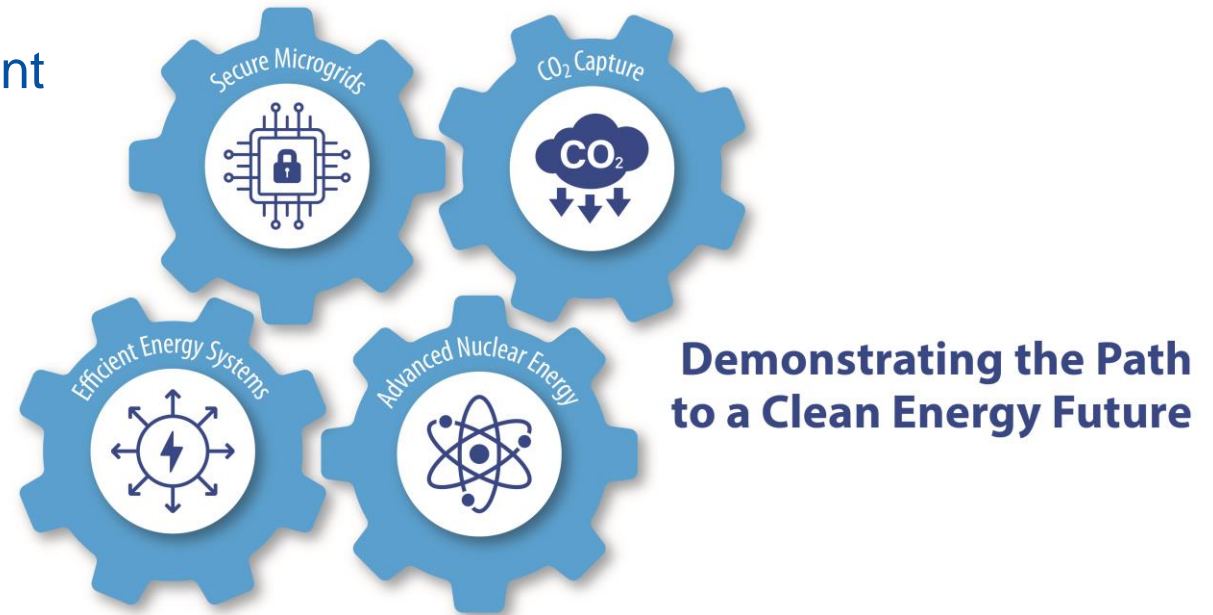
- Monthly Coordination Calls – DOE/NRC/NRIC

Accelerating advanced reactor demonstration & deployment

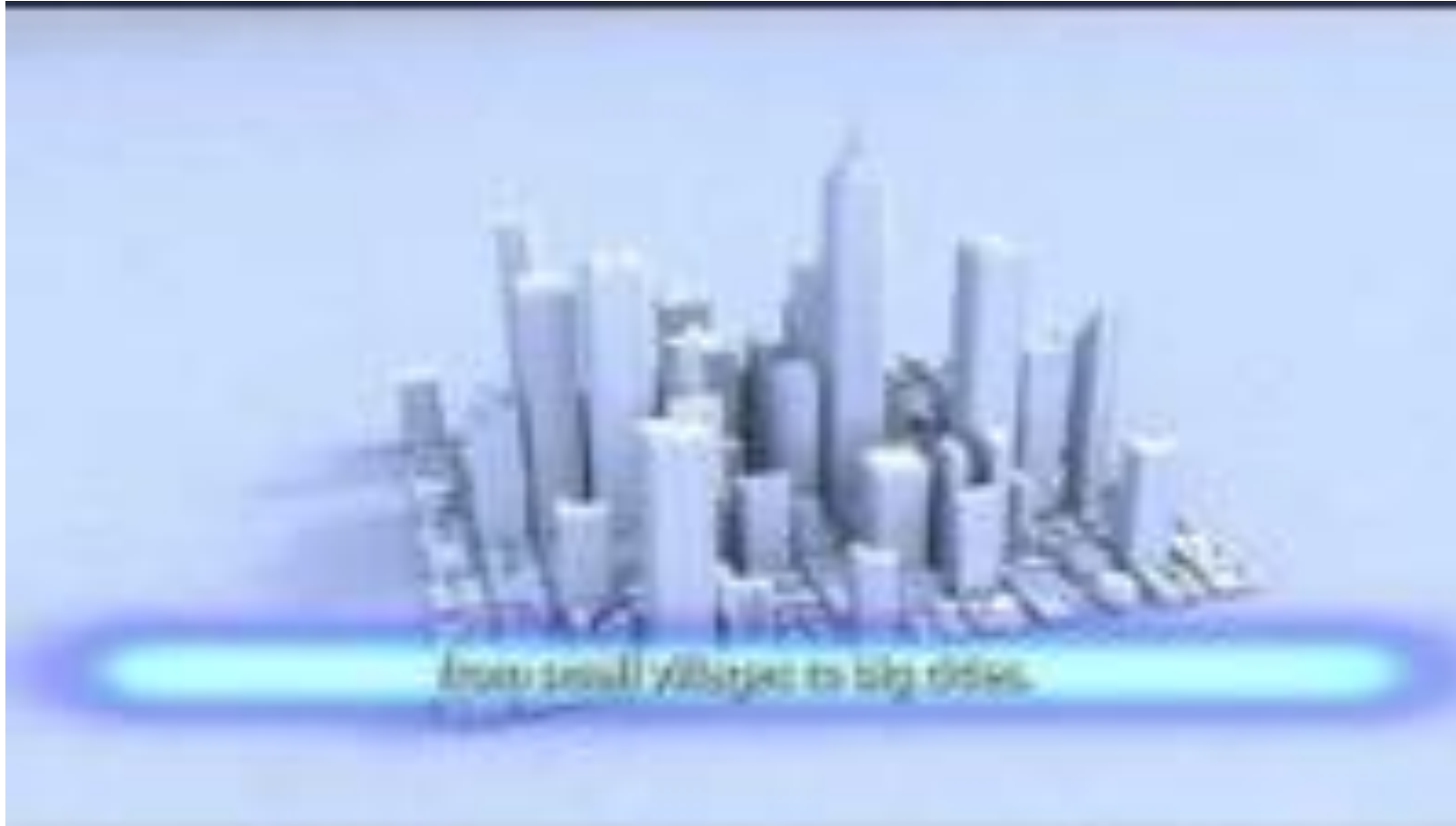


Collaborations

- National Labs
 - Partnering on key Net-Zero initiatives with all 17 national labs
- State of Idaho
 - EV infrastructure & workforce development
- Universities
 - Innovations, research, and workforce development
- Tribal Nations
- Net-Zero World
 - Ukraine
 - Indonesia
 - ASEAN



Transforming the world to a net-zero future



Contact Information



JHANSI KANDASAMY

Executive Director,
INL Net-Zero Program
Jhansi.Kandasamy@inl.gov
(o) 208-526-5390

Visit our website at inl.gov/net-zero/





Backup slides

Research, Development, & Demonstration at Idaho National Laboratory

- INL's site characteristics and operations make it a highly relevant demonstration site
- Representative of a city or county.
- INL will lead by example; lessons learned can inform best-practices



600+

Total vehicles



5,700+

Employees



300+

DOE-owned
buildings & trailers



~50

MW purchased
in FY20

U.S. nuclear industry recognizes the demand for new nuclear power projects

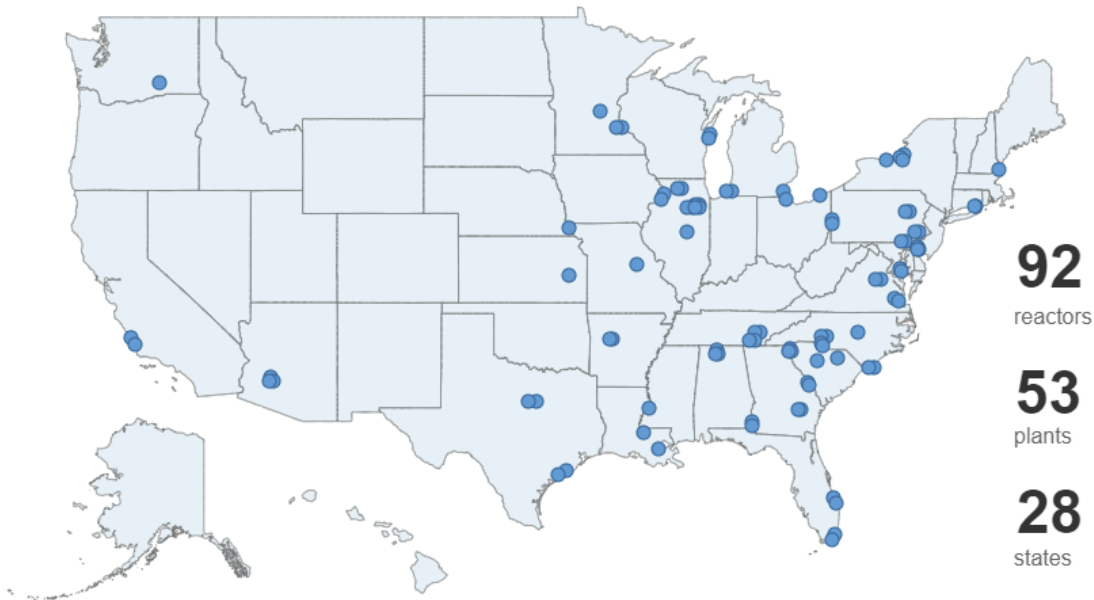
Utilities recently identify the need to add 100 gigawatts of nuclear power by 2050, more than doubling current capacity.



NUCLEAR ENERGY
FACT SHEET 2022

United States

NUCLEAR POWER ACROSS THE U.S.

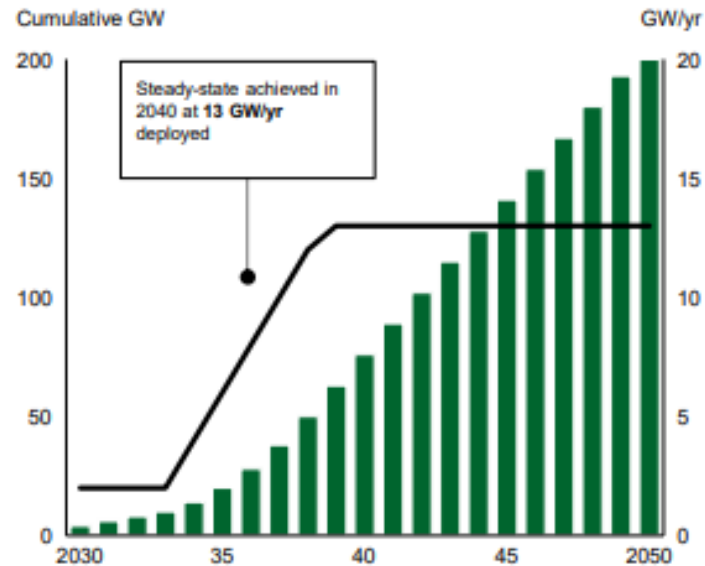


Today, 92 reactors provide nearly 20% of the electricity produced for our power grid and more than half of our carbon-free electricity – more than solar, wind, hydro, and geothermal combined.

- Utilities are prepared to invest in nuclear energy because it is a proven non-carbon-emitting solution
- New reactor designs are simpler, more versatile, and more economical at scale
- Utilities are evaluating reusing retired coal plant sites to leverage existing infrastructure and workforce
- Emissions avoided by adding 100 gigawatts of nuclear power is equivalent to taking more than 100 million cars off the road.

U.S. domestic nuclear capacity has the potential to scale from ~100 GW in 2023 to ~300 GW by 2050

New nuclear deployment starting in 2030
Annual deployment (GW/yr) built and Cumulative GW online



New nuclear deployment starting in 2035
Annual deployment (GW/yr) built and Cumulative GW online

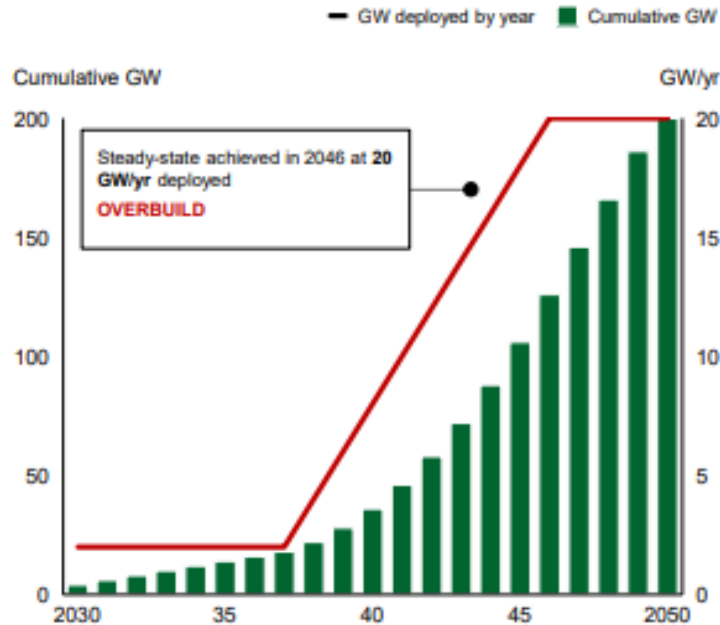
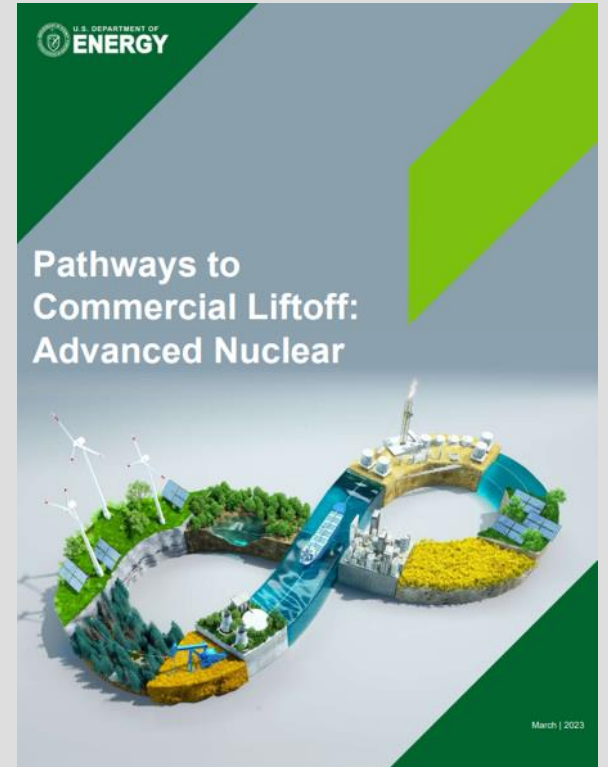


Figure 1: New nuclear build-out scenarios and implications for industrial base capacity requirements



“Power system decarbonization modeling, regardless of level of renewables deployment, suggests that the U.S. will need ~550–770 GW of additional clean, firm capacity to reach net-zero.”

Next level integrated energy systems – *Demonstrating the pathway to commercial use*

Scaling up
high temp
electrolysis for
hydrogen
production

